

6. VI · Measurement, methods, statistics and history

Starter Quiz ·

GRE Subject Test · GRE Psychology

Name: _____ Score: _____

1. In a simple least-squares regression with an intercept and one predictor, Pearson correlation is $r = 0.6$. What percentage of the sample outcome sum of squares is accounted for by the fitted line?

2. IQ has mean 100 and SD 15. What is the z-score of 130?

3. Which design feature most directly strengthens a comparison between conditions by preventing systematic selection through allocation?

☐ random assignment
☐ a reliable measure
☐ a large sample
☐ random sampling
4. $p = 0.03$ means there is a 3% chance the null hypothesis is true.

☐ True ☐ False
5. A Type I error is

☐ a small effect size
☐ using the wrong test
☐ rejecting a true null hypothesis
☐ missing a real effect
6. A high internal-consistency coefficient alone establishes that a score has the intended meaning for every use.

☐ True ☐ False
7. One school's volunteers are randomly assigned to two routines. Which statement is justified?

☐ Every later source of bias has disappeared
☐ The groups must have identical starting scores
☐ Allocation can strengthen the comparison among volunteers, while generalisation still needs evidence
☐ They are now a random sample of all students

8. Any numerical baseline difference proves that a properly implemented random allocation failed.
- ☐ True ☐ False
9. A study's scientific interest alone justifies deceiving participants.
- ☐ True ☐ False
10. For the five constructed points $x = -2, -1, 0, 1, 2$ and $y = x^2$, Pearson correlation is zero. What follows?
- ☐ No relationship of any kind exists
- ☐ A straight-line association can be zero while a nonlinear rule is exact
- ☐ The nonlinear rule proves a causal effect in a real population
- ☐ The outcomes are all equal

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Answers ·

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1. **36**

Under the stated model, $R^2 = r^2 = 0.6^2 = 0.36$, or 36%. This describes the linear fit to these data; it does not establish causal explanation or guaranteed prediction in a new population.

2. **2**

$z = (130 - 100)/15 = 2$. The score is two SDs above the reference mean. No normality assumption is needed for this conversion alone.

3. **random assignment**

Proper random assignment removes systematic selection through the allocation process and supports causal comparisons with other design assumptions. Chance baseline differences and later biases can remain. Random sampling concerns population selection.

4. **False**

The p-value concerns equally or more extreme test statistics under a specified null model and assumptions. It does not give a posterior probability that the null hypothesis is true.

5. **rejecting a true null hypothesis**

A Type I error is a false positive: rejecting a null hypothesis that is actually true. Missing a real effect is a Type II error.

6. **False**

Internal consistency concerns a source of score variation. Interpretation, dimensionality, population and use need additional relevant evidence.

7. **Allocation can strengthen the comparison among volunteers, while generalisation still needs evidence**

Random allocation and population sampling are separate processes. Neither perfect balance nor universal generalisation follows.

8. **False**

Chance differences can occur. Examine allocation implementation and report the relevant starting information rather than assuming exact equality.

9. **False**

Applicable ethics requirements, justification, safeguards and appropriate debriefing matter; scientific interest alone is insufficient.

10. **A straight-line association can be zero while a nonlinear rule is exact**

Symmetry gives zero centred cross-product here, but the U-shaped rule is exact. Pearson correlation describes linear association.